A comparison of health-related quality of life between Jordanian and British orthognathic patients

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SUMMARY The aim of this study was to assess health-related quality of life (HRQoL) in adult Jordanian patients referred for orthognathic treatment, and to compare this with previously published data from a British cohort. Thirty-eight Jordanians (21 females and 17 males; aged 16–31 years) who were about to commence a course of orthognathic treatment completed a generic HRQoL questionnaire [Short-Form 36 (SF-36)] and a condition-specific orthognathic quality-of-life questionnaire (OQoLQ). The questionnaires were completed prior to commencing any pre-surgical orthodontic treatment. The data were compared using the Mann–Whitney *U*-test for independent groups with non-normally distributed data.

There were no statistically significant differences between the Jordanian males and females for any of the OQoLQ or SF-36 items; hence, the groups were combined for analysis. When comparing the OQoL data with that of the British sample, there was no statistically significant differences for three of the four domains: dentofacial aesthetics (P=0.726), social aspects (P=0.096), or the awareness of dentofacial aesthetics (P=0.066). There was, however, a significant difference for oral function (P=0.016), with the Jordanian group reporting a poorer quality of life (QoL) (mean value 10.9) than the British cohort (mean value 8.4). However, it is questionable whether this difference would be of clinical relevance. While it was not possible to directly compare the results of the SF-36 questionnaires with the same British cohort, Jordanian patients had generally lower scores, and therefore a poorer QoL, than reported in other studies. These differences may be cultural or may be due to differences in the health care system's criteria for funding, and this needs further investigation.

Introduction

Since the 1990s, the focus of health care has generally shifted to a broader emphasis on patient-centred outcomes, including health-related quality of life (HRQoL). Proffit *et al.* (2003) stated that the major reason for treatment of dentofacial problems is to improve the quality of life (QoL), but traditionally this has not been included in research as an outcome measure. HRQoL assessments made by orthodontic and orthognathic patients provide an overview of how dentofacial disharmony affects them and such measures can also be used as outcome measures following treatment.

A review of the literature clearly shows that both dental and facial disharmony have significant effects and can be an important social disadvantage (Shaw *et al.*, 1980, 1985; Shaw, 1981). The motivating factors of patients requesting orthognathic treatment are many and varied, but a desire for improvement in aesthetics and alleviation of functional problems are the two most commonly cited reasons (Stirling *et al.*, 2007).

Oral HRQoL has been defined as 'the absence of negative impacts of oral conditions on social life and a positive sense of dentofacial self-confidence' (Inglehart and Bagramian, 2002). There are two main groups of HRQoL instruments. The first are generic measures, which provide a summary of general HRQoL and may generate a profile measure or a single index of health. These include the Short-Form 36 (SF-36)-item health survey (Ware and Sherbourne, 1992) and the EuroQol (EuroQol Group, 1990). The second are condition specific, which focus on a particular condition, disease, population, or problem, and are devised to measure patients' perceptions of the outcomes of health care interventions. These measures are potentially more responsive to small, but clinically important, changes in health. Many examples of these measures are available such as QoL for epilepsy (Becker et al., 1993), stroke (Williams et al., 1999), asthma (Juniper et al., 1993), and the orthognathic quality-of-life questionnaire (OQoLQ) for orthognathic patients (Cunningham et al., 2000, 2002). This latter questionnaire examines QoL in four domains: social, function, dentofacial aesthetics, and awareness of dentofacial aesthetics.

Careful assessment of patients requesting orthognathic treatment is imperative as the success of treatment and the related QoL changes may well depend on appropriate patient selection. QoL changes have been studied more extensively in patients undergoing orthognathic than orthodontic treatment *per se* (Bennett and Phillips, 1999). Several studies have investigated the effect of dentofacial deformities on the QoL among subjects from different ethnic and cultural backgrounds (Hatch *et al.*, 1998; Cunningham, 2000; Motegi *et al.*, 2003; Nardi *et al.*, 2003; Lee *et al.*,

2007; Sadek and Salem, 2007; Tajima et al., 2007). These studies showed a wide variation in the pre-treatment OoL among different populations, thus indicating the need for further comparative research to investigate the impact of dentofacial deformity on QoL in different ethnic groups and different cultures. There is a paucity of published studies investigating OoL in Arab orthognathic patients (Sadek and Salem, 2007) Therefore, the purpose of this study was to assess HRQoL in adult Jordanian patients referred for orthognathic treatment in order to establish whether the needs of the patients treated in this relatively new orthognathic service are similar to those in other countries and, in addition, to compare the findings with a British cohort to identify any differences which may need to be taken into consideration during treatment (Cunningham, 2000).

Patients and methods

This study was approved by the Deanship of Scientific Research at the University of Jordan. Written informed consent was obtained and all subjects were assured of confidentiality of the questionnaires.

The subjects for the study were recruited from new patient referred to the Orthodontic Department at Jordan University, the Ministry of Health, and the Armed Forces Hospitals which are all located in Amman (the capital and largest city in Jordan). All subjects who fulfilled the following criteria were approached and asked if they were willing to participate in the study:

- 1. Over 16 years of age.
- 2. About to commence a course of orthognathic treatment, with no active treatment started.
- 3. No history of previous facial surgery.
- 4. No congenital deformities (e.g. clefts or syndromes) or traumatically acquired deformities.

All subjects were asked to complete both the conditionspecific questionnaire (OQoLQ) (Cunningham *et al.*, 2000, 2002) and a generic health-related questionnaire, the SF-36 (Ware and Sherbourne, 1992). The OQoLQ consists of 22 items divided into four domains and each item is rated on a four-point scale. A total OQoLQ score can range from 0 to 88 with higher scores indicating poorer QoL and lower scores representing improved QoL. The SF-36 consists of 36 statements divided into eight domains: role physical, physical functioning, bodily pain, vitality, general health, social functioning, role emotional, and mental health. For each subscale, raw data are transformed and summed on a 0–100 per cent scale, with a higher score indicating a better QoL.

The questionnaires were distributed to the patients during a routine pre-treatment visit to the hospital. They were invited to complete the questionnaire after the joint clinic in the waiting room and then return it in a sealed envelope to an individual not involved in the study. The questionnaires were distributed to 50 patients and returned fully completed by 38. Five questionnaires were not completed at all despite the patients having agreed to participate and seven were excluded as they were returned with incomplete data. The response rate was therefore 80 per cent.

The results from the OQoLQ were compared with data from the British cohort on which the OQoLQ was developed (Cunningham, 2000). It was not possible, however, to directly compare the results of SF-36 questionnaires because these data were not available for pre-treatment British orthognathic patients. Hence, these data were compared with published data from two other studies of pre-treatment Japanese and Chinese orthognathic patients (Lee *et al.*, 2007; Tajima *et al.*, 2007) and also with data for British patients at the end of the pre-surgical orthodontic phase (Cunningham *et al.*, 2000).

Statistical analysis

Analysis of the data was performed using the Statistical Package for Social Sciences, Version 14.00 (SPSS Inc., Chicago, Illinois, USA). The data were tested for normality and as they were not normally distributed, the Mann–Whitney *U*-test was used to compare both the male and female Jordanian patients and the Jordanian and British patients.

Results

Table 1 summarizes the characteristics of the patients. The mean ages of the Jordanian and British patients were 22.53 years [standard deviation (SD) 4.27 years] and 22.31 years (SD 6.34 years), respectively. There was no significant age difference between the two groups.

 Table 1
 Characteristics of the Jordanian sample and the British cohort (Cunningham, 2000).

Patients	Gender		Malocclusion			
	Male, <i>n</i> (%)	Female, <i>n</i> (%)	Class III, n (%)	Class II, <i>n</i> (%)	Other, <i>n</i> (%)	
Jordanian	17 (44.7)	21 (55.3)	21 (55.3)	12 (31.6)	5 (13.1)	
British	32 (38.1)	52 (61.9)	48 (57.1)	32 (40.5)	2 (2.4)	

Orthognathic quality-of-life questionnaire

The mean scores and SDs for the OQoLQ for male and female Jordanian patients are presented in Table 2. There were no statistically significant differences between the genders for any of the four domains (Table 3); hence, the data were pooled for comparison between the Jordanian and British patients.

Table 3 shows a comparison of the four domains between the two countries. There were no statistically significant differences for dentofacial aesthetics (P=0.726), social aspects (P=0.096), or awareness of dentofacial aesthetics (P=0.066). There was, however, a significant difference for oral function (P=0.016), with the Jordanian patients reporting higher scores and, therefore, a poorer QoL related to oral function than the British patients.

Short-Form 36

The means and SDs for the eight subscales of the SF-36 for the male and female Jordanians are presented in Table 4. Again, there were no statistically significant differences between the genders; hence, the data were pooled for comparison with other studies (Table 5). Jordanian patients

Table 2 Mean and standard deviation (SD) for the orthognathicquality-of-life questionnaire (OQoLQ) domains for Jordanianmales and females.

	Male (<i>n</i> =17)		Female $(n=21)$		Significance
	Mean	SD	Mean	SD	
Dentofacial aesthetics	12.3	6.1	13.8	6.2	NS
Social aspects	18.6	9.2	17.2	11.0	NS
Oral function	11.6	4.3	10.4	6.2	NS
Awareness of dentofacial aesthetics	8.1	4.5	9.8	4.8	NS
OQoLQ total	50.5	21.0	50.7	23.2	NS

NS, not significant.

Table 3 Comparison of the four domains of the orthognathic quality-of-life questionnaire (OQoLQ) for the Jordanian and British cohorts (Cunningham, 2000).

	Jordanian ($n=38$)		British ($n=84$)		Significance
	Mean	SD	Mean	SD	_
Dentofacial aesthetics	13.1	6.1	13.9	5.6	NS
Social aspects	17.8	10.1	14.7	9.9	NS
Oral function	10.9	5.4	8.4	5.5	0.016*
Awareness of dentofacial aesthetics	9.1	4.7	7.5	5.1	NS
OQoLQ	50.6	22.0	44.4	20.7	NS

NS, not significant; *P < 0.05.

showed lower pre-surgery scores than the British cohort for all SF-36 subscales. They also exhibited lower scores than Japanese patients in all subscales, except the general health domain (Tajima *et al.*, 2007) and had lower scores than those reported by Chinese orthognathic patients, with the exception of general health and bodily pain domains (Lee *et al.*, 2007).

Discussion

The cohort of patients in the present investigation was intended to be similar to those in the British study on which the OQoLQ was developed, with regard to age and gender (Table 1). There were, however, fewer patients. This is due to the fact that the orthognathic service in Jordan is still developing, with fewer specialist centres in that country compared with the United Kingdom; hence, fewer patients undergo this form of treatment in Jordan. Using the knowledge obtained from the current study, future research should involve multiple centres and inclusion of the OQoLQ as part of orthognathic standard patient records. A larger sample size should be included in future investigations.

Both generic and condition-specific QoL measures were used in this study. This is because generic measures can be used to compare different populations but they are limited in their ability to detect the effects of certain interventions. Therefore, the use of a combination of condition-specific and generic measures has been proposed for the assessment of orthognathic patients (Bennett and Phillips, 1999). The questionnaires used in this study have previously been shown to have good validity and reliability (McHorney *et al.*, 1993, 1994; Cunningham *et al.*, 2000, 2002).

The response rate in the present investigation was 80 per cent, which is adequate for a study of this type and compares favourably with the response rate in the British study (Cunningham, 2000). The questionnaires were distributed during routine appointments and the patients were to complete them at that time, as it was felt that this would

Table 4Differences in Short-Form 36 subscale scores amongthe Jordanian patients according to gender.

	Male (<i>n</i> =17)	Female $(n=21)$	Significance
	Mean % (SD)	Mean % (SD)	
Physical functioning	89.41 (21.35)	83.10 (19.27)	NS
Role physical	76.47 (31.21)	66.67 (36.51)	NS
Bodily pain	76.71 (16.35)	73.05 (18.12)	NS
General health	70.24 (15.67)	63.90 (23.47)	NS
Vitality	61.18 (7.40)	51.67 (22.66)	NS
Social functioning	63.97 (29.28)	63.69 (24.66)	NS
Role emotional	54.90 (45.55)	63.49 (37.87)	NS
Mental health	60.47 (14.27)	59.05 (18.89)	NS

NS, not significant.

	Jordanian	British	Japanese	Chinese	
	Mean % (SD)	Mean % (SD)*	Mean % (SD)	Mean % (SD)	
Physical functioning	85.92 (20.20)	95.00 (12.93)	95.0 (7.8)	95.26 (9.41)	
Role physical	71.05 (34.15)	92.50 (20.92)	86.9 (25.7)	82.89 (31.94)	
Bodily pain	74.68 (17.22)	85.90 (18.23)	82.4 (19.7)	74.51 (21.99)	
General health	66.74 (20.35)	71.50 (16.65)	62.9 (19.6)	65.04 (18.74)	
Vitality	55.92 (18.00)	62.17 (19.81)	56.1 (215)	62.37 (15.37)	
Social functioning	63.82 (26.44)	82.93 (23.54)	84.7 (22.1)	80.43 (16.75)	
Role emotional	59.65 (41.12)	80.00 (29.88)	80.2 (34.2)	70.18 (37.54)	
Mental health	59.68 (16.78)	69.23 (21.22)	66.0 (19.8)	70.79 (14.92)	

Table 5 Comparison of the Short-Form 36 subscale scores for the Jordanian patients and those reported for British (Cunningham, 2000), Japanese (Tajima *et al.*, 2007), and Chinese (Lee *et al.*, 2007) patients.

*Questionnaires administered at the end of pre-surgical orthodontics.

secure the highest completion rate. A number of patients either failed to complete or only partially completed the questionnaire, despite agreeing to be part of the study; this may have been because patients did not have adequate time or they may have been nervous about the appointment and therefore felt unable to concentrate on the task. An alternative would have been to allow patients to complete the questionnaires at home and mail them back, although there is no guarantee that this would have increased the response rate.

When compared with the British sample, there were no statistically significant differences for three of the four domains: dentofacial aesthetics, social aspects, or awareness of dentofacial aesthetics (Table 3). There was, however, a significant difference for QoL related to oral function (P=0.016). The Jordanian group gave a higher mean value for function (10.9), and hence a poorer QoL, than the British cohort (mean value 8.4). Functional problems in the Jordanian sample appear to have a greater impact on QoL than in the British group, although whether a 2.5 difference is of clinical relevance is open to debate. This funding may be due to cultural differences, where Jordanian patients are more comfortable justifying their need for treatment based on function rather than aesthetics. The Jordanian patients were also funded by the government for their orthodontic treatment and eligibility for funding of treatment in Jordan is for severe deformities which affect function, while the criteria in the United Kingdom perhaps allow aesthetic concerns to be given more consideration. This has implications during management as it is important for clinicians to understand all the patients' concerns and it may be that the Jordanian patients are less likely to discuss their aesthetic concerns. Questions specific to aesthetics and function should therefore be asked during the initial assessment to ensure these issues have been discussed and the clinician is clear about the patient's reasons for requesting treatment. It would be interesting to investigate the QoL of privately funded patients in Jordan to ascertain whether the findings are similar when government funding is not an issue. The similarity in the pre-treatment QoL scores between the two investigated populations does, however, suggest that this questionnaire may be utilized in future QoL studies in Jordanian orthognathic patients.

Short-Form 36

For the SF-36 questionnaire, it was not possible to compare the results with the pre-treatment British orthognathic patients because these data were not available at the time that this study was undertaken. However, SF-36 scores are available for British patients at the end of pre-surgical orthodontics (Cunningham et al., 2002) Jordanian patients had lower scores than the British patients for all SF-36 subscales. This finding, however, must be treated with some caution due to the different treatment stages (Table 5). Jordanian patients also exhibited lower scores than Japanese orthognathic patients in all subscales, except the general health domains (Tajima et al., 2007) and had lower scores than those reported by Chinese orthognathic patients, with the exception of the general health and bodily pain domains (Lee et al., 2007) From these comparisons, it may be tentatively suggested that Jordanian patients presenting for orthognathic treatment have a poorer QoL than those in the United Kingdom, China, and Japan. Many reasons could be postulated for why this may be the case. For example, it may be that concerns regarding appearance are not discussed as freely in Jordan and people therefore develop deep-seated concerns and poorer QoL. Alternatively, it may be that other factors affect their QoL which are not related to the dentofacial deformity itself. All these theories warrant investigation. The fact that Jordanian patients had lower SF-36 scores but similar OQoLQ values to the British patients is also further evidence of the insensitivity of the SF-36 questionnaire to detect the effects of specific conditions on QoL.

Conclusions

- Using a condition-specific QoL measure, it was found that there were few differences between the Jordanian and British samples, with the only significant difference being for the function domain. However, whether this difference is sufficiently large to be of clinical relevance is debatable.
- 2. The SF-36 scores suggest that the Jordanian patients may have a poorer QoL than orthognathic patients in some other countries, although this is a tentative conclusion which warrants further investigation.

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